

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Robert R. Moore, et al.

Title: APPARATUS AND METHOD FOR CONTROLLED  
DECOMPOSITION OXIDATION OF GASEOUS POLLUTANTS

Serial No.: New Divisional of Prior Copending U.S. Patent  
Application No. 09/228,706

Prior Application Filing Date: January 12, 1999

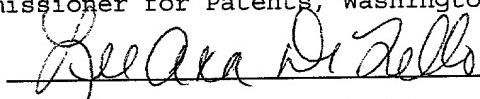
Prior Application Group Art Unit: 1764

Prior Application Examiner: H. Tran

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Commissioner for Patents, Washington, DC 20231.



Lee Ann DiLello

**November 6, 2001**

Date of Deposit

Assistant Commissioner for Patents  
Washington, D.C.20231

PRELIMINARY AMENDMENT

Sir:

Prior to examining the instant application on the  
merits, please amend the application as follows:

IN THE SPECIFICATION

On page 1 of the specification, before the first line, please insert the following paragraph:

RELATED APPLICATIONS

This is a division of U.S. Application Serial No. 09/228,706, which is a continuation-in-part of U.S. Application Serial No. 09/005,856, filed on January 12, 1998.

IN THE CLAIMS

Please cancel claims 1-21.

22. A method for scrubbing chemical pollutants in a gas stream comprising the steps of:

continuously introducing said gas stream into a scrubbing chamber, said scrubbing chamber containing coated packing in at least two vertically separated beds, said coating being adapted to entrap or react with said pollutants;

monitoring the amount of said pollutants being removed from said stream; and

regenerating the coating on one of said beds while continuously flowing said gas stream through the other of said beds.

23. (new) The method of Claim 22 wherein said monitoring the amount of said pollutants being removed from said stream comprises measuring the concentration of a pollutant in the gas exiting said scrubber.

24. (new) The method of Claim 22 further comprising the step of:

introducing said coating composition to said beds at predetermined time intervals.

25. (new) A method for oxidative treatment of gaseous pollutants in a process gas stream, comprising the steps of:

conducting said gas stream into a thermal reactor via a process gas inlet, wherein said thermal reactor comprises heating elements, and wherein said process gas inlet comprises a conduit terminating with a portion of said conduit within said reactor wherein said portion of said conduit is located within a tube which projects beyond the end of said conduit to define a chamber within said tube, said tube having an open end communicating with the interior of said reactor; and

introducing other gases into said conduit via an independent inlet communicatively connected to said conduit, said independent inlet positioned along said conduit before said conduit terminates in said tube, said thermal reactor comprising a central chamber comprising said heating elements, an entry end and an exit end of said chamber, a side inlet communicating with an exterior air space defined by an exterior wall of the reactor and said heating elements, an interior air space communicating with said exterior air space, said interior air space defined by an interior wall of

the reactor and said heating elements, and an orifice in said interior wall for introducing sir from said interior space into said central chamber.

26. (new) The method of Claim 25, wherein said conduit is curved.

27. (new) The method of Claim 25, wherein said conduit and independent inlet are concentrically located.

28. (new) The method of Claim 25, wherein a plurality of gas streams are introduced to said reactor via a plurality of process gas inlets.

29. (new) The method of Claim 25, further comprising the step of:

flowing the gas stream after treatment in said thermal reactor to a particle removal chamber comprising.

30. (new) The method of Claim 29, wherein said particle removal chamber comprises:

a packed bed;  
at least one liquid inlet positioned at the top of said chamber to provide a washing liquid to an intermittent sprayer; and

a continuous sprayer, wherein the packed bed is for trapping and condensing particles and said gas stream is upwardly flowed through said bed against downwardly flowing liquid; and

an air inlet petitioned below said liquid inlets to provide flowing air onto the upper portion of said bed to cool the upper portion of said bed to promote condensation and particle growth within said bed.

31. (new) The method of Claim 25, further comprising the step of:

flowing the gas stream after treatment in said thermal reactor to a scrubber for removing chemical pollutants.

32. (new) The method of claim 31, wherein said scrubber comprises:

an inlet for introducing said gas stream into a scrubbing chamber of said scrubber via an inlet, wherein said scrubbing chamber containing coated packing in at least two vertically separated beds, said coating being adapted to entrap or react with said pollutants.

33. The method of Claim 31, further comprising the steps of:

monitoring the amount of said pollutants being removed from said stream by said scrubber;

controlling selective introduction of a regenerativa coating composition onto each of said beds to regenerate said coating on said packing.

34. (new) The method of Claim 33, wherein said step of monitoring is performed by a detector that measures the concentration of a pollutant in the gas exiting said scrubber.

35. (new) The method of Claim 33, further comprising the step of:

introducing said coating composition to said beds at predetermined time intervals.

36. (new) A method of treating gaseous pollutants in a gas stream, comprising the steps of:

oxidatively treating a gas stream within a thermal reactor with other gases introduced into said thermal reactor;

introducing said oxidatively treated gas stream into a scrubber for removing chemical pollutants in said gas stream;

monitoring the amount of said pollutants being removed from said stream by said scrubber; and

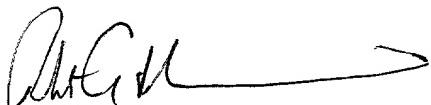
selectively introducing a regenerative coating composition onto each of said vertical beds to regenerate said coating on said packing.

**REMARKS**

This is a divisional of application serial no. 09/228,706 now allowed. Applicants have provided a marked up copy of the claims in Appendix A; a clean copy of paragraphs inserted into the specification in Appendix B; and a clean set of the pending claims in Appendix C.

An early examination on the merits is earnestly solicited.

Respectfully submitted,



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## APPENDIX A

## MARKED UP COPY OF THE CLAIMS

In the Claims

1.-21. Canceled

22. A method for scrubbing chemical pollutants in a gas stream comprising the steps of:

continuously introducing said gas stream into a scrubbing chamber, said scrubbing chamber containing coated packing in at least two vertically separated beds, said coating being adapted to entrap or react with said pollutants;

monitoring the amount of said pollutants being removed from said stream; and

regenerating the coating on one of said beds while continuously flowing said gas stream through the other of said beds.

23. (new) The method of Claim 22 wherein said monitoring the amount of said pollutants being removed from said stream comprises measuring the concentration of a pollutant in the gas exiting said scrubber.

24. (new) The method of Claim 22 further comprising the step of:

introducing said coating composition to said beds at predetermined time intervals.

25. (new) A method for oxidative treatment of gaseous pollutants in a process gas stream, comprising the steps of:

conducting said gas stream into a thermal reactor via a process gas inlet, wherein said thermal reactor comprises heating elements, and wherein said process gas inlet comprises a conduit terminating with a portion of said conduit within said reactor wherein said portion of said conduit is located within a tube which projects beyond the end of said conduit to define a chamber within said tube, said tube having an open end communicating with the interior of said reactor; and

introducing other gases into said conduit via an independent inlet communicatively connected to said conduit, said independent inlet positioned along said conduit before said conduit terminates in said tube, said thermal reactor comprising a central chamber comprising said heating elements, an entry end and an exit end of said chamber, a side inlet communicating with an exterior air space defined by an exterior wall of the reactor and said heating elements, an interior air space communicating with said exterior air space, said interior air space defined by an interior wall of

the reactor and said heating elements, and an orifice in said interior wall for introducing sir from said interior space into said central chamber.

26. (new) The method of Claim 25, wherein said conduit is curved.

27. (new) The method of Claim 25, wherein said conduit and independent inlet are concentrically located.

28. (new) The method of Claim 25, wherein a plurality of gas streams are introduced to said reactor via a plurality of process gas inlets.

29. (new) The method of Claim 25, further comprising the step of:

flowing the gas stream after treatment in said thermal reactor to a particle removal chamber comprising.

30. (new) The method of Claim 29, wherein said particle removal chamber comprises:

a packed bed;  
at least one liquid inlet positioned at the top of said chamber to provide a washing liquid to an intermittent sprayer; and

a continuous sprayer, wherein the packed bed is for trapping and condensing particles and said gas stream is upwardly flowed through said bed against downwardly flowing liquid; and

an air inlet petitioned below said liquid inlets to provide flowing air onto the upper portion of said bed to cool the upper portion of said bed to promote condensation and particle growth within said bed.

31. (new) The method of Claim 25, further comprising the step of:

flowing the gas stream after treatment in said thermal reactor to a scrubber for removing chemical pollutants.

32. (new) The method of claim 31, wherein said scrubber comprises:

an inlet for introducing said gas stream into a scrubbing chamber of said scrubber via an inlet, wherein said scrubbing chamber containing coated packing in at least two vertically separated beds, said coating being adapted to entrap or react with said pollutants.

33. The method of Claim 31, further comprising the steps of:

monitoring the amount of said pollutants being removed from said stream by said scrubber;

controlling selective introduction of a regenerativa coating composition onto each of said beds to regenerate said coating on said packing.

34. (new) The method of Claim 33, wherein said step of monitoring is performed by a detector that measures the concentration of a pollutant in the gas exiting said scrubber.

35. (new) The method of Claim 33, further comprising the step of:

introducing said coating composition to said beds at predetermined time intervals.

36. (new) A method of treating gaseous pollutants in a gas stream, comprising the steps of:

oxidatively treating a gas stream within a thermal reactor with other gases introduced into said thermal reactor;

introducing said oxidatively treated gas stream into a scrubber for removing chemical pollutants in said gas stream;

monitoring the amount of said pollutants being removed from said stream by said scrubber; and

selectively introducing a regenerative coating composition onto each of said vertical beds to regenerate said coating on said packing.

## APPENDIX B

CLEAN COPY OF PARAGRAPHS CHANGED IN THE SPECIFICATION

On page 1 of the specification, before the first line,  
please insert the following paragraph:

RELATED APPLICATIONS

This is a division of U.S. Application Serial No. 09/  
228,706, which is a continuation-in-part of U.S. Application  
Serial No. 09/005,856, filed on January 12, 1998.

DRAFTED BY D.E.C.

**APPENDIX C****CLEAN COPY OF PENDING CLAIMS**

22. A method for scrubbing chemical pollutants in a gas stream comprising the steps of:

continuously introducing said gas stream into a scrubbing chamber, said scrubbing chamber containing coated packing in at least two vertically separated beds, said coating being adapted to entrap or react with said pollutants;

monitoring the amount of said pollutants being removed from said stream; and

regenerating the coating on one of said beds while continuously flowing said gas stream through the other of said beds.

23. The method of Claim 22 wherein said monitoring the amount of said pollutants being removed from said stream comprises measuring the concentration of a pollutant in the gas exiting said scrubber.

24. The method of Claim 22 further comprising the step of:

introducing said coating composition to said beds at predetermined time intervals.

25. A method for oxidative treatment of gaseous pollutants in a process gas stream, comprising the steps of:

conducting said gas stream into a thermal reactor via a process gas inlet, wherein said thermal reactor comprises heating elements, and wherein said process gas inlet comprises a conduit terminating with a portion of said conduit within said reactor wherein said portion of said conduit is located within a tube which projects beyond the end of said conduit to define a chamber within said tube, said tube having an open end communicating with the interior of said reactor; and

introducing other gases into said conduit via an independent inlet communicatively connected to said conduit, said independent inlet positioned along said conduit before said conduit terminates in said tube, said thermal reactor comprising a central chamber comprising said heating elements, an entry end and an exit end of said chamber, a side inlet communicating with an exterior air space defined by an exterior wall of the reactor and said heating elements, an interior air space communicating with said exterior air space, said interior air space defined by an interior wall of the reactor and said heating elements, and an orifice in said interior wall for introducing air from said interior space into said central chamber.

26. The method of Claim 25, wherein said conduit is curved.

27. The method of Claim 25, wherein said conduit and independent inlet are concentrically located.

28. The method of Claim 25, wherein a plurality of gas streams are introduced to said reactor via a plurality of process gas inlets.

29. The method of Claim 25, further comprising the step of:

flowing the gas stream after treatment in said thermal reactor to a particle removal chamber comprising.

30. The method of Claim 29, wherein said particle removal chamber comprises:

a packed bed;

at least one liquid inlet positioned at the top of said chamber to provide a washing liquid to an intermittent sprayer; and

a continuous sprayer, wherein the packed bed is for trapping and condensing particles and said gas stream is upwardly flowed through said bed against downwardly flowing liquid; and

an air inlet petitioned below said liquid inlets to provide flowing air onto the upper

portion of said bed to cool the upper portion of said bed to promote condensation and particle growth within said bed.

31. The method of Claim 25, further comprising the step of:

flowing the gas stream after treatment in said thermal reactor to a scrubber for removing chemical pollutants.

32. The method of claim 31, wherein said scrubber comprises:

an inlet for introducing said gas stream into a scrubbing chamber of said scrubber via an inlet, wherein said scrubbing chamber containing coated packing in at least two vertically separated beds, said coating being adapted to entrap or react with said pollutants.

33. The method of Claim 31, further comprising the steps of:

monitoring the amount of said pollutants being removed from said stream by said scrubber;

controlling selective introduction of a regenerativa coating composition onto each of said beds to regenerate said coating on said packing.

34. The method of Claim 33, wherein said step of monitoring is performed by a detector that measures the concentration of a pollutant in the gas exiting said scrubber.

35. The method of Claim 33, further comprising the step of:

introducing said coating composition to said beds at predetermined time intervals.

36. A method of treating gaseous pollutants in a gas stream, comprising the steps of:

oxidatively treating a gas stream within a thermal reactor with other gases introduced into said thermal reactor;

introducing said oxidatively treated gas stream into a scrubber for removing chemical pollutants in said gas stream;

monitoring the amount of said pollutants being removed from said stream by said scrubber; and

selectively introducing a regenerative coating composition onto each of said vertical beds to regenerate said coating on said packing.